

Precision Membrane Optical Shell (PMOS) Technology for Lightweight LIDAR Apertures, Phase I

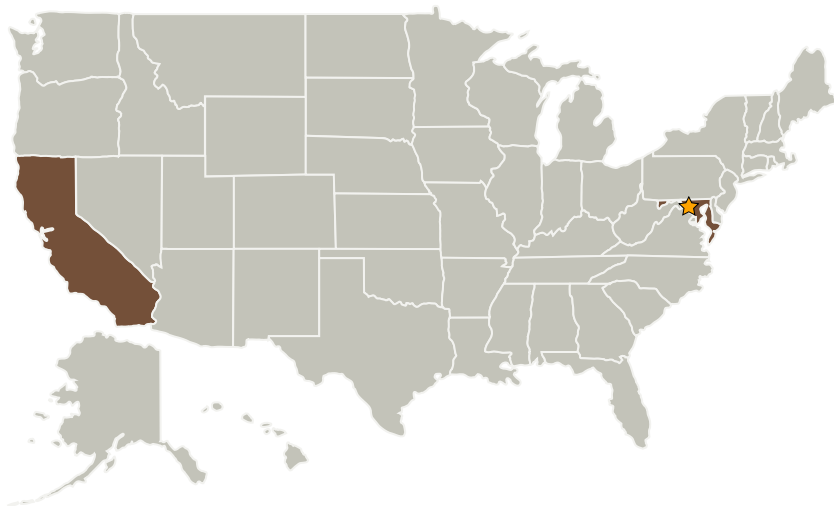
Completed Technology Project (2006 - 2006)



Project Introduction

Precision membrane optical shell (PMOS) technology is an innovative combination of 1) ultra lightweight optically smooth membrane thin films, 2) advanced mold based fabrication techniques that transform the films into single surface load bearing structures through the introduction of optically relevant permanent curvature, and 3) discrete active boundary control that enables rigid body alignment and maintenance of optical prescriptions in face of environmental disturbances. Reflector areal densities of better than 2 kg/m² (including alignment and figure control actuators) are projected. Current, measured surface figure is better than 1 to 3 microns rms at the 0.2m size, and we are poised for further improvements. Basic demonstrated manufacturing techniques are scaleable to 1.4m+ diameter single surface apertures. Materials are space proven, and stowage and deployment techniques exist that support eventual transition to space flight application. Mevicon Inc. and its team members, UAT, thus proposes the required further improvements of basic technology and the demonstration of applicability of Precision Membrane Optical Shell (PMOS) technology for ground and space based LIDAR receivers. The key resulting innovation is implementation of improved formation approaches to realize very low mass, low cost LIDAR apertures. Other NASA and DOD applications are expected as precision and aperture size increase.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Mevicon, Inc.	Supporting Organization	Industry	Sunnyvale, California

Primary U.S. Work Locations

California	Maryland
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.4 Manufacturing
 - └ TX12.4.3 Electronics and Optics Manufacturing Process